

Design Specification

Underground Residential Developments

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1. Purpose and Scope

This specification details requirements for the Electrical Reticulation and Public Lighting design of an Underground Residential Development (URD), up to 11 kV or 22 kV as applicable, within the TasNetworks distribution area.

Design undertaken by the Developer's Designer shall be confined to the area defined in the TasNetworks Design Parameters Advice including attachments.

All design shall be to TasNetworks required Design Standards and in accordance with this specification and referenced documents.

2. References

2.1. TasNetworks controlled documents

This specification is not a standalone document and shall be read in conjunction with the TasNetworks' related documentation listed below under the TasNetworks Customer Choice arrangement for Underground Residential Subdivisions.

The requirements detailed in any Offer for Network Connection Services and the Network Extension Agreement shall take precedence over this Design Specification.

It is the Developer's responsibility to make themselves fully aware of and to ensure compliance with TasNetworks controlled documents:

- The Developer Guide for Underground Residential Subdivisions;
- TasNetworks Network Planning Requirements;
- Drawing Drafting Standard;
- Distribution Design Standard – Kiosk Substation ;
- Distribution Design Standard – Underground System;
- Distribution Design Standard – Public Lighting;
- Electrical Construction Specification;
- Civil Construction Specification;
- TasNetworks Materials and Assemblies; and
- TasNetworks' Environment & Heritage Design and Construction Standard.

2.2. Australian Standards, Laws and Statutory Requirements

All design work shall be completed in accordance with, and shall conform in all respects to, all relevant Australian Standards, Laws, relevant statutory requirements and Electrical Supply Industry best practice.

2.3. Conflicts

If conflicting requirements are found to exist between this specification, the listed documents above, or any relevant Australian Standards, the most onerous requirements shall apply unless written clarification has been provided by TasNetworks.

3. Definitions, Acronyms and Abbreviations

3.1. Definitions

As-Built Documentation: The Issue for Construction documentation to which approved variations and other required information during the course of construction has been added.

Audits: Check for compliance with the applicable TasNetworks specifications, drawings and safety requirements.

Authorisation: means an approval, consent, permit, clearance, licence or other preconditions required under Law of from an authority in relation to the Project

Certificate of Electrical Reticulation Design: A certificate from the Designer advising that all design undertaken for the Developer has been completed in accordance with TasNetworks requirements, relevant Australian Standards and certified so by a CPEng.

Certificate of Public Lighting Design: A certificate from the Designer advising that all design undertaken for the Developer has been completed in accordance with TasNetworks requirements, the requirements of the Public Body, relevant Australian Standards and certified so by a CPEng.

Construction Plan: A Construction Plan or plans as defined in Drawing Drafting Standard.

Contractor: A company or person (including a subcontractor engaged by the contractor) approved by TasNetworks and selected by the Developer to undertake construction works associated with the project.

Deed of Materials Compliance: A document signed by the verifying all materials used are in accordance with TasNetworks' requirements, including TasNetworks' Materials List.

Designer: A company selected by the Developer to design and oversee material procurement associated with the Project.

Design Standard: The standard of design required by TasNetworks. This is the standard of design that ensures a quality of supply acceptable to TasNetworks customers, continuity of supply and the least long-term cost to TasNetworks.

Developer: Any person or company which enters into an agreement with TasNetworks for the electrical reticulation works

Development: An area within which the Developer has entered into an agreement with TasNetworks for the Electrical Reticulation works.

Electrical Reticulation: Any works within the Development directly associated with the supply of electricity to that Project.

Electricity Footpath Allocation: The corridor in the footpath allocated by the local government authority for the installation of electric cables and plant

Issue for Construction documentation: Construction issue drawings or documentation that have been assessed as compliant by TasNetworks and certified by the CPEng, for use in construction of the Project.

Laws: includes Acts, ordinances, regulations, by-laws, orders, awards and proclamations applicable in Tasmania.

Liaison Officer: The TasNetworks officer who forms the direct point of contact for the Developer. Sometimes referred to as TasNetworks' Site Manager.

Project: All works to be undertaken for installation of Electrical Reticulation infrastructure included in a Development.

Project Manager: A company or person selected by the Developer to facilitate, manage and coordinate installation and construction works for the Project on behalf of the Developer.

Public Body: A Public Body is a government department or state authority, and includes the following:

- Council / local government authority; and
- Department of State Growth.

Public Lighting: Road lighting installed as part of the Project.

Shall: Mandatory action (equivalent to 'must').

Should: Strongly recommended action. Evidence of due diligence may be requested by TasNetworks where action is not taken.

TasNetworks' Customer Representative (TCR): The TasNetworks officer who is responsible for facilitating connection of the Development to the TasNetworks electrical network.

3.2. Acronyms and Abbreviations

CMEN - Common Multiple Earthed Neutral.

HV - High Voltage ($\geq 1000 V_{AC}$)

LV - Low Voltage ($< 1000 V_{AC}$)

RMU - Ring Main Unit.

CPEng – Certified Practising Engineer

KOG – Kiosk Ordering Guide

4. Safety and Environmental Considerations

The safety and environmental considerations for the project are the responsibility of the Developer.

The Developer shall document and implement a safety management system that complies with all relevant Laws.

The safety of personnel and equipment shall be paramount at all times.

A full safety in design assessment shall be conducted for the URD design in accordance with applicable WHS law and the TasNetworks design standards.

It is the responsibility of the Developer and the Accredited Service Providers (for design and construction) to ensure that environmental due diligence is followed and all reasonable efforts are made to minimise impacts to the environment.

TasNetworks' Environment & Heritage Design and Construction Standard defines the environmental and heritage requirements for design and construction in residential subdivisions. The standard provides TasNetworks' approach to environmental due diligence in design and construction for Underground Residential Subdivisions, as reflected through its legislative and regulatory obligations and strategic plans. It is the minimum expectation in relation to environment and heritage due diligence.

5. Acts, Regulations and Requirements

5.1. Laws and Authorisations

The Developer shall comply with all relevant Laws and Authorisations.

5.2. Other authorities

The Developer shall comply with specific requirements of other relevant Authorities and Utilities.

6. Project Approvals

The Developer shall provide TasNetworks with written evidence that all necessary approvals have been obtained and other relevant Authorities notified of the Project.

7. Accreditation

The Designer shall be accredited by TasNetworks. TasNetworks accreditation process for design is outlined in TasNetworks' Authorised Electrical Designer – Guide and Application Form.

8. Distribution Planning Information

Prior to the design phase commencing, a scope of work (the extension scope) outlining TasNetworks' planning requirements will be produced by TasNetworks as a key input to the designer. In order to produce this scope, detailed information for the proposed development is required by TasNetworks.

8.1. Information Required by TasNetworks

The Developer shall provide an overall concept plan for the entire project. This includes a detailed plan of the present stage to be designed and constructed, and the proposed sequence of all known future stages. An overall layout plan of the development is required which details the following:

1. location plan, road names, road boundaries and general notes as relevant;
2. proposed allotments, allotment numbers, road boundaries, pathways, allotment dimensions and general notes as relevant;
3. future development stages, if relevant, detailing allotments and streets;
4. location and dimensions of existing and proposed easements;
5. location of driveways and other services; and
6. location of any significant natural and cultural values.

Future additional energy loads shall be considered and incorporated into the proposed design and construction plan where appropriate (for example, where the development includes proposed commercial centres and schools).

8.2. Information Required by the Designer

TasNetworks will provide a scope to the designer which will detail the technical requirements and constraints that shall be adhered to when undertaking the design. This scope will detail information such as capacity requirements to be maintained, existing circuit arrangements and additional assets required to be contributed by TasNetworks. Additional technical information will also be supplied such as the system voltage, point(s) of connection to the TasNetworks distribution network, fault level, up-stream protection details, surrounding assets or any known issues.

Additional information required for design purposes should be requested by the designer through a formal request for information (RFI) to the TasNetworks Customer Representative as necessary (refer appendix D).

9. Development Plan

A Development plan is a conceptual layout drawing which shows the proposed electrical configuration of an entire subdivision, taking into account future stages. In some cases, a development plan must be prepared by the designer if one does not already exist.

Refer to the Distribution Planning Requirements document for detailed development plan requirements.

10. Public Consultation

Consideration shall be made in the design to the impact that planned new assets may have on existing residents. Where new assets are included in a design in close proximity to existing residences, the Designer shall notify these householders of the works to be undertaken.

11. Construction Plan/Issue for Construction Drawings

Drawings submitted shall be to the satisfaction of TasNetworks and in accordance with the Drawing Drafting Standard and any requirements specified in the relevant design standards.

TasNetworks requires design drawings to be submitted in 'real world' latitude and longitude coordinates, with correct drawing numbers as per the Drawing Drafting Standard. To obtain an appropriate range of drawing numbers in sequence, the designer will need to contact the TasNetworks Customer Representative.

12. Augmentation Works

Any works that involve a direct connection to existing TasNetworks-owned electrical infrastructure are considered to be augmentation works. This applies to both design and construction activities.

All augmentation design and construction works shall be undertaken by TasNetworks. The scope provided by TasNetworks will detail the boundary of works for the Designer, and will outline components of the design which are the responsibility of TasNetworks such as:

- poletop cable terminations and overhead switchgear; and
- HV and LV underground cable terminations to existing TasNetworks owned assets (e.g. connections to cables installed during a previously completed subdivision stage).

The developer shall seek clarification from TasNetworks where ambiguity exists with regard to the boundary of works to be undertaken by each party.

Any and all boundaries between TasNetworks and the developer shall be shown on the Construction Plan provided to TasNetworks as part of the Design Documentation Submission

13. Materials and Equipment

All materials for installation and construction work are to be procured by the Developer or its contractors and shall be in accordance with TasNetworks' Materials List. All materials and goods shall be new, free from defects, of merchantable quality, fit for the specified purpose, and conform fully to the requirements of TasNetworks.

To ensure the maintenance of appropriate reliability and safety standards during the transition period to contestability, TasNetworks' Materials List will have the following three categories of materials:

1. **Prescribed Materials** – These items shall be purchased from TasNetworks approved supplier as specified in the Materials List. Example items include kiosk substations.
2. **Approved Materials** – For each type of material or good in this category, product details are specified together with approved suppliers. A process will be developed for TasNetworks to assess the suitability of additional products and suppliers. If a product is assessed as meeting TasNetworks' requirements (including being of sufficient quality and compatible with the distribution network), they will be added to the Approved Materials List. Further information including timelines and associated fees will be released at a later date.
3. **Consumable Materials** – TasNetworks preference is for these items to be purchased from the listed vendor. Alternative vendors may be used but these items shall be equivalent to those in the materials list and comply with all relevant Australian Standards. Example items that do not have to be purchased from an approved vendor include PVC electrical insulation tape, nuts, bolts and washers.

13.1. Assemblies

The TasNetworks approved materials list consists of parts that have been grouped into standard assemblies (e.g. turret or cabinet assemblies), which can be referenced by the designer to indicate required materials. It is recommended that the designer make reference to these assemblies for standard arrangements throughout the design.

Note there may be cases where additional components are required to complete an assembly. TasNetworks accepts no liability for the accuracy of the standard assemblies, and it is the responsibility of the developer to check and ensure accuracy for the bill of materials, to ensure correct equipment and quantities are ordered for construction.

14. Asset Identification and Labelling

TasNetworks' requires asset ID numbers (unique identifiers) to be assigned to all public lighting columns and kiosk substations. Designers shall contact TasNetworks when the number of new substations and light columns has been ascertained to obtain ID numbers for inclusion on the final design plans.

The Developer shall order the required labels from TasNetworks during the design phase, and is required to affix these during construction. All asset labels must be clearly shown on the design drawings.

All public lighting columns and kiosk substations have a unique identifier, and require an asset tag which will be provided by TasNetworks.

All turrets and cabinets shall be labelled with a unique number, in order starting with the number 1 from the start of the new subdivision (refer to the Electrical Construction Specification for more information).

Construction Plans shall have all asset IDs shown on them.

15. Substation and Cabinet Locks

TasNetworks' has specific requirements for kiosk substation and cabinet locks which may change depending on the location of the assets. Designers shall specify the locks required according to TasNetworks Materials and Assemblies document. The Developer shall order the required locks from TasNetworks during the design phase, and TasNetworks will affix these after asset handover.

Locks required are detailed below:

- Kiosk Substation
 - Substation external padlocks (two, one for the HV end and one for the LV end)
 - Switchgear locks (one for each HV earth switch)
- Cabinet
 - Door lock

16. Existing TasNetworks Assets

Technical layout design drawings showing the electrical configuration of the subdivision shall include all existing TasNetworks assets within the boundary of the development, as provided by TasNetworks.

Redundant TasNetworks assets, or assets to be removed or abandoned during construction, shall be clearly labelled and shown on any relevant layout drawings.

The design drawings and construction plan shall clearly articulate the designated work responsibilities with regards to existing TasNetworks assets. Note that the disconnection and removal of any TasNetworks infrastructure shall be completed by TasNetworks.

17. Design Deliverables

The Developer shall submit all relevant design documentation to TasNetworks. This documentation shall include, but not be limited to:

- A completed Design Audit Submission Checklist.
- Construction Plans in accordance with the requirements of Section 11, certified by the Designer, and show any physical work boundaries between TasNetworks and the developer in accordance with Section 12;
- An electrical Development Plan for the entire subdivision, if required by the Distribution Planning Requirements document.
- A single line diagram for every substation and HV/LV single line layouts where applicable;
- LV Drop calculations for the entire LV reticulation of the project, including calculations for the entire development plan (if one exists), submitted in both electronic and hard copy form;
- kiosk substation and free-standing HV switchgear site requirements – as per Distribution Design Standard – Kiosk Substations ;
- Layout drawings indicating all easements that will be made available to TasNetworks prior to asset handover;
- Lighting Design Deliverables as per Distribution Design Standard – Public Lighting;
- Confirmation from the Public Body accepting the lighting design submitted;
- A full equipment schedule which references approved TasNetworks stock item numbers and Assemblies as set out in TasNetworks Materials and Assemblies Document;
- A specific schedule of HV and LV cables including all cable details;
- A completed Schneider Kiosk Ordering Guide (KOG) outlining the details of the substation(s) to be ordered (where applicable);
- A contractor works order or equivalent project scope and schedule, outlining the high level construction activities required by the design;
- Cable pulling tension calculations for selected cable runs (where necessary);
- Evidence of a completed safety in design assessment;
- Evidence of a completed environmental risk assessment, including all necessary environmental permits and approvals (e.g. council environmental approval for the subdivision);
- Evidence that the design has been provided to local council and any utilities or public bodies that are affected by the design;
- A project drawing register, detailing drawing reference, description, revision, reviewed and approved dates;
- Completed Certificate of Electrical Reticulation Design, refer Appendix A;
- Completed Certificate of Lighting Design, refer Appendix B;
- Completed Non-standard Public Lighting Indemnity Form, refer Appendix C (where applicable); and
- Any other documentation as required by the Design Audit Checklist, or Design Standards.

18. Design Audit

18.1. Design Audit Process

TasNetworks will audit all designs in accordance with this specification, TasNetworks' Design Audit Process, all relevant TasNetworks Design Standards, relevant Australian Standards, legal requirements and best industry practice.

The designer shall complete and submit the TasNetworks Design Audit Submission Checklist (including the declaration) when submitting the completed design for auditing to TasNetworks. Designs submissions not including this checklist shall be rejected by TasNetworks.

A Certificate of Acceptance will be issued by TasNetworks for designs which pass the design audit. This certificate will be required as evidence of design acceptance by TasNetworks during the first construction audit gate (refer to the Construction Audit Process documentation). The Design Material submitted for Audit can only become Issue for Construction documents once a Certificate of Acceptance is received from TasNetworks.

The designer may request from TasNetworks a copy of the audit checklist that will be used to assess each design.

For designs that meet the majority of TasNetworks' criteria but where minor rectification work is required, a Certificate of Conditional Acceptance will be issued. This certificate provides authorisation for the design to proceed up to but not including the construction phase; however the rectified design will be required to be resubmitted to TasNetworks for re-auditing prior to construction. A Certificate of Acceptance will be issued by TasNetworks for the sufficiently corrected design, and this certificate shall be presented to TasNetworks during the first construction audit gate in order to proceed with further construction.

18.2. Audit Criteria

Audits shall be for general compliance and acceptance by TasNetworks only and shall in no way relieve the Designer of responsibility for suitability or correctness of the design.

The audit shall be for compliance to the following:

- offer of Network Connection Services;
- original project plan submitted by the Developer (unless otherwise agreed by TasNetworks);
- the scope(s) provided by TasNetworks;
- TasNetworks' design / planning standards and criteria;
- design material to be submitted as outlined in 16 above;
- this specification;
- any additional information or advice provided during a formal RFI process;
- environmental, safety, operability and maintainability considerations;
- correct referencing to Construction Standards;
- Drawing Drafting Standard; and
- TasNetworks' materials specifications and requirements, including TasNetworks Materials and Assemblies Document.

Should the design not comply with TasNetworks' requirements, a report detailing the non-compliance(s) will be issued to the designer. All non-compliances shall be rectified and a re-Audit undertaken to ensure such non-compliance has been rectified prior to issue for construction. TasNetworks will apply a charge for each re-Audit as per the hourly rates outlined in TasNetworks' Developer Guide for Underground Residential Subdivisions. Note: The use of the correct / specified materials will be subject to site Audit during construction.

Accredited Electrical Designers may request a copy of the full design audit check sheet used by TasNetworks, prior to submitting a completed design.

18.3. Design Material Submitted for Audit

All design deliverables listed in Section 17 are required to be submitted for audit.

19. Construction

Construction shall not commence prior to TasNetworks' final Design Audit and release of the Approved, Audited Issue for Construction documentation. Construction undertaken prior to release of the Issue for Construction documentation and associated pre-start meeting, as required, shall be at the Developer's risk and rectification of faults shall be undertaken at no cost to TasNetworks.

20. Access to the TasNetworks Distribution System

If there are existing TasNetworks assets (e.g. power lines or cables) traversing the proposed development, the Developer or TasNetworks may choose for TasNetworks to relocate these assets at the Developer's cost.

The Electrical Contractor shall not have access to the TasNetworks distribution system unless specifically authorised in writing by TasNetworks. The Electrical Construction Specification clause "Access to the TasNetworks Distribution System" details responsibility for supply and installation of materials for connection to the TasNetworks distribution system associated with the Project.

21. High Voltage Network Design

21.1. Network Planning Arrangement

The TasNetworks Network Planning Requirements document sets out general network planning arrangement details. Any additional requirements will be detailed in TasNetworks' extension and augmentation scopes (refer to the Developer Guide for Customer Choice) and shall be incorporated into the Developer's design.

21.2. Kiosk Substation / Switchgear Selection

The available range of kiosk substations and associated switchgear is contained in the Kiosk Design Standard and general information for the selection of HV switchgear is provided in the TasNetworks Network Planning Requirements document.

All new kiosk substation installations shall use a circuit breaker for HV transformer protection due to the benefits it provides over fuse protection.

21.3. Kiosk Substation Site Selection

General requirements for site selection are contained in the Kiosk Design Standard, and any specific requirements will be detailed in the extension and augmentation scopes (refer to the Developer Guide for Customer Choice).

21.4. Easement Requirements for Kiosk Substations

Easements shall be acquired in accordance with details provided in the Distribution Design Standard – Kiosk Substations.

21.5. Cable Selection

The standard range and application of underground cables is listed in the Underground Design Standard.

21.6. Special Requirements

Where heavily loaded and/or multiple cables are to be installed, the TasNetworks Customer Representative (TCR) shall advise TasNetworks requirements, which may include cable ratings to be used in design, cable trench cross sections and non-standard bedding material.

21.7. Future Extension

Unless directed otherwise by the TCR, conduit(s) for future HV cable shall be terminated and capped in line with conduit for future LV distribution cables. The location of conduit ends shall be clearly identified on drawings submitted as part of the Design Audit. Easements shall be acquired over all conduit routes for future cable.

22. Low Voltage Network Design

22.1. General

TasNetworks' low voltage distribution system operates as a Multiple Earthed Neutral (MEN) system. All designs shall ensure that the MEN configuration remains and that all neutrals are bonded across open points unless otherwise specified by TasNetworks.

22.2. Network Planning and Design Arrangement

The TasNetworks Network Planning Requirements document defines network planning arrangement details.

22.3. LV Switchgear Selection for Kiosks

The available range of kiosk substations and associated switchgear is contained in the Kiosk Design Standard and general information for the selection of LV switchgear is provided in the TasNetworks Network Planning Requirements document.

All new kiosk substation installations shall use a circuit breaker for LV cable protection due to the benefits it provides over fuse protection.

22.4. Turret/Cabinet Arrangement

TasNetworks' standard arrangement for underground LV supply is the 'loop in loop out' turret/cabinet system which eliminates the need for underground cable joints. It is a requirement of the LV Design that this arrangement be used wherever possible.

Where the stage of the electrical development ends at a linking turret/cabinet, it shall be installed in its final position. If, to facilitate the future installation of the next LV distribution cable, a conduit bend or bends is required, TasNetworks will specify the requirements for size and/or length in the extension and augmentation scopes.

22.5. Servicing

Low voltage customer services shall be clearly shown on the subdivision electrical layout drawing. Service conduits shall not be more than 15m, shall not cross property boundaries, and must not be run along the street to reach further properties unless servicing a cul-de-sac or equivalent block configuration.

22.6. Property Access

TasNetworks requires that electricity LV turrets be placed on the footpath between property boundaries adjacent to the survey peg. Should the Developer require special driveway arrangements, such arrangements shall be indicated on the Developer's plans submitted to TasNetworks and if additional costs result they shall borne by the Developer.

22.7. ADMD

The After Diversity Maximum Demand (ADMD) value to be applied is defined in the TasNetworks Network Planning Requirements document.

22.8. Voltage Drop

Permissible voltage range and design rules are specified in the TasNetworks Network Planning Requirements document.

22.9. Service Phasing

The following principles shall be adopted when determining service phasing:

- the total number of services on each phase shall as far as possible be equal;
- the sum of the moments of each phase – the product of load (number of houses) and distance (number of spans) from the source transformer, should be approximately equal so that voltage drop is equal along the LV circuit; and
- designs shall, as far as practicable, eliminate possible future out-of-balances.

Design drawings provided in the Design Material Submitted for Audit shall indicate the service connections that will be allocated from each turret to each lot.

22.10. Cable Selection

TasNetworks' standard ranges of cables are to be utilised as per the Underground Design Standard. The TCR may specify requirements for cable size for network security or future load requirements.

The Underground Design Standard also provides physical details of cables including minimum bending radii's and maximum pulling tensions.

22.11. Cable Joints

Joints are not permitted in HV or LV cables unless written agreement has been received from the TCR.

22.12. Installation Guidelines

The TasNetworks Network Planning Requirements document includes general statements on installation issues and recommended actions.

23. Cables and Conduits

23.1. Cable Data

General and electrical design information is provided for cables in the Underground Design Standard, including minimum bending radii and maximum pulling tensions.

23.2. Direct Buried Cables

To enable sufficient ratings in contingency scenarios, TasNetworks requires that all HV and LV cables are direct buried unless additional mechanical protection is required as per the Distribution Design Standard – Underground Systems (e.g. underneath road crossings).

23.3. Route selection

Factors to be taken into account for the cable route selection are included in the Underground Design Standard.

The design of cable routes shall be practical for the installation of cables and, where possible, the design of long cable runs and cable runs with a number of horizontal bends should be confirmed with the cable installer.

At locations such as the front of kiosk substations, cable is to be installed in sweep bends with a radius not less than the cable minimum bending radius. Applicable details are provided in the Underground Design Standard.

Underground cable installations shall not be constructed through private lots using easements to provide access between streets or stages of a development. Developers shall create a laneway (road reserve) between property allotments to provide a suitable access for underground cable installation and maintenance. Approval shall not be granted for a cabling route without associated vehicular access.

23.4. Cable Pulling

Maximum cable installation pulling tensions provided in the Underground Design Standard shall not be exceeded.

The design shall be such that the maximum allowable cable side pressure, due to pulling around bends, is not exceeded during cable installation. Where reduced cable installation pulling tensions are required the revised maximum installation pulling tension shall be clearly noted on the Issue for Construction documentation.

Note that TasNetworks may require design calculations be submitted for selected cable runs.

23.5. Conduits

All cables and conduits are to be installed as per the Electrical Construction Specification. The design of all cables and conduits shall allow installation in accordance with the Electrical and Civil Construction Specifications.

Spare conduits shall be provided as specified by TasNetworks to facilitate future cable as specified in the TasNetworks Network Planning Requirements document.

Unless directed otherwise by TasNetworks, conduit(s) for future HV cable shall be terminated and capped in line with conduit for future LV distribution cable.

Refer Section 22.4 for the requirement to enable a future subdivision extension to connect to an existing end turret or cabinet of a development.

24. Earthing

24.1. Earthing System

A Combined Multiple Earthing system (CMEN, where HV and LV earths are tied together) is preferred for kiosk substations installed in underground residential subdivisions and all reasonable steps shall be taken to provide this system. General information on CMEN and separate HV and LV earth systems is provided in the Underground Design Standard along with site requirements.

The Designer shall be responsible for conducting tests to establish earthing conditions. TasNetworks may be requested to provide input if general earthing conditions in the vicinity of the project are known.

24.2. Additional Earth Cable in Trenching

In areas of poor earthing the addition of an earth cable in trenches may be utilised to save considerable cost and effort in achieving the specified earth readings and, should the cable be required, the trench earth cable shall be detailed in the Issue for Construction documentation.

The additional earth cable may be utilised to connect to existing assets or otherwise utilised to aid in achieving the specified earth readings.

24.3. Developments Adjoining Existing CMEN Areas

The Developer is not authorised to make the connection to an existing installed earth system. As a result it is not possible, during construction, to confirm if the designed earthing performance for the interconnected installation has been achieved.

In the majority of circumstances, the local earthing system including the surrounding MEN of the Development will provide compliant step and touch potentials; this shall be verified through testing.

In circumstances where CMEN earthing compliance requires a MEN interconnection by TasNetworks on commissioning, appropriately conservative design calculations may be used and accepted by TasNetworks as sufficient evidence of earthing compliance. In these circumstances, the Developer shall demonstrate to TasNetworks, through testing or other means, that their installed earthing achieves a performance equivalent to the design calculations.

Note that this approach will only be accepted where earthing conditions are especially complex and local earthing options are of grossly unreasonable cost or effort. Techniques such as deep drilling

and trench earthing are the preferred methods of achieving local earthing system compliance, and shall be required where deemed reasonable by TasNetworks.

In circumstances where CMEN earthing compliance is difficult to achieve, on request and depending on availability, TasNetworks may be able to provide earthing performance information for systems in the vicinity of the development.

24.4. Cable Screen Earthing

Cable screen earthing shall be in accordance with the requirements of the Underground Design Standard.

24.5. Low Voltage Earthing

LV turrets, cabinets, and public lighting shall be earthed in accordance with the Underground and Public Lighting Design Standards and Standard Construction Drawings as applicable.

24.6. Proximity to other Utility Services

Required clearances to other services (gas, water, sewage, and telecommunications) assets are provided in the Standard Construction Drawings. Approval shall be obtained from all relevant utilities with assets in proximity to the developer's designed earthing. This approval shall form part of the design documentation for audit.

25. Protection

All protection settings for HV and LV circuit breakers must be provided as part of the design submission. This includes the protection settings for any existing substations that utilise a spare LV circuit as part of the design.

26. Connection to Existing TasNetworks Assets

For the purpose of Electrical Works the Developer shall not have access to the TasNetworks distribution system including the earthing system. However, the design shall include equipment up to the construction interface point in accordance with the Electrical Construction Specification.

27. Easements and Wayleaves

The Developer shall grant to, or obtain in favour of, TasNetworks any easement/s and wayleaves for electricity purposes as nominated, containing such terms and conditions as required by TasNetworks, in accordance with the Connection Contract between TasNetworks and the Developer. The required sizes for underground cable and kiosk substation easements are detailed in the relevant design standards.

For further information refer to the Developer Guide for Underground Residential Subdivisions.

28. Public Lighting

28.1. Conditions for Public Lighting

Only equipment selected from the TasNetworks Materials and Assemblies list shall be accepted as public lighting. In order for lighting to be considered for the Public Lighting Tariff scheme, TasNetworks standard luminaires shall be used.

28.2. Public Body Approval and Lighting Category

The Designer shall confer with the Public Body to obtain necessary lighting scheme approval and agreement in relation to the lighting category, or categories, to be applied. Additionally the Designer shall provide documentary evidence to TasNetworks, as required in the Certificate of Lighting Design, demonstrating Public Body acceptance of the Public Lighting design submitted.

28.3. Design Requirements

The TCR shall supply necessary TasNetworks design information including luminaire and lamp information and luminaire photometric files ('I' tables in .cie format or in .ies format) to the Designer for use in the lighting layout design. Electrical design shall utilise service cable and details provided in the Public Lighting Design Standard and Standard Construction Drawings.

28.4. Design Information to be Provided

Documentation demonstrating compliance with the Public Lighting standard AS/NZS 1158 is required.

Schemes that do not fully comply with the requirements of the Public Lighting Design Standard, except as defined below, require provision of the indemnity included as Appendix C. Such documentation shall be submitted with the Certificate of Lighting Design.

28.5. Information to be Provided on Construction Plan

Information demonstrating design compliance with AS/NZS 1158 or the requirements of the relevant Public Body shall be provided on construction plans.

In addition, any information necessary for correct installation of the scheme as detailed in the Public Lighting Construction Standard Drawings shall be referenced and a full materials schedule with assemblies shall be included.

28.6. Construction

The design shall allow for installation in accordance with details provided in the Public Lighting Standard Construction Drawings and on the alignment agreed with the relevant Public Body.

28.7. Cables and Conduits

The Public Lighting Design Standard provides detail of cables to be used to supply Lighting installations. All underground cables shall be installed in conduits as detailed in the Public Lighting and Underground Standard Construction Drawings.

28.8. Earthing

All TasNetworks standard Public lighting columns shall be earthed with an earth conductor installed with the supply cabling in accordance with details provided in the Public Lighting and Underground Construction Standard Drawings.

The earthing cable shall be bonded to the earth bar at the first Turret/Cabinet provided with an earth rod. At each column the earth cable shall be bonded to the column.

The earth conductor shall be installed with the supply cabling and shall have a cross sectional area in accordance with the Australian /New Zealand Wiring Rules AS/NZS 3000.

28.9. Pedestrian Floodlighting

Should supplementary floodlighting be required at pedestrian crossings, TasNetworks shall provide the specifications.

Appendix A: Certificate of Electrical Reticulation Design

PROJECT NAME:

PROJECT No:

LOCATION:

CONSTRUCTION PLAN No:

I/We(Please Print)

of

being the Developers' Electrical Designer for the above Project do hereby certify that TasNetworks' requirements in accordance with Specifications for URD Design have been completed, including the following:

- (i) All necessary approvals have been obtained and other authorities notified – refer Section 6 (Project Approvals).
- (ii) Required Design Material has been submitted – refer Section 16 (Design Material to be Submitted for Audit).
- (iii) Construction Plan complies with Section 11 (Construction Plan).
- (iv) Use of TasNetworks' current standard construction details in accordance with the Underground and Public Lighting Construction Standard Drawings, as applicable (except as directed in writing by TasNetworks).

Design Sign-off:

_____ Date: _____
(Designer to Sign)

Certified Practicing Engineer certification:

_____ (CPEng to Sign) _____ (CPEng Number)

Dated thisday of20

Attachments:	Circulation:
1 Project approvals – refer Section 6	- Project File
2 Construction Plan – refer Section 11	
3 LV Drop calculations both electronic and hard copy form	

4 Additional documentation required by the TCR (if applicable)

Appendix B: Certificate of Lighting Design

PROJECT NAME:

PROJECT No:

LOCATION:

CONSTRUCTION PLAN No:

I/We(Please Print)

of

being the Developers’ Lighting Designer for the above Project do hereby certify that TasNetworks’ requirements in accordance with this Specification for Underground Residential Subdivision Design have been completed, including the following:

- (i) Documentation to demonstrate Public Body lighting scheme approval and agreement with the lighting category, or categories, to be applied.
- (ii) Documentation to demonstrate compliance with AS/NZS 1158 (note that compliance parameters are found in AS/NZS 1158.3.1:2005 Appendix E for CAT P or AS/NZS 1158.1.1:2005 Appendix D for CAT V).
- (iii) Documentation to demonstrate acceptance by the Public Body of the lighting design including the alignment and location of columns.
- (iv) Should the Public Body not require AS/NZS 1158 compliance, the TasNetworks “Non-Standard Public Lighting Indemnity Form”, Appendix C of this document, is required to accompany this certificate. Refer Section 28.4.
- (v) Use of TasNetworks’ luminaire photometric data.
- (vi) Use of TasNetworks’ current standard lighting components in accordance with the Distribution Design Standard – Public Lighting (except as specified in Clause 28.9)

Dated thisday of20 .

(CPEng to Sign)

(CPEng Number)

Attachments: _____ Circulation:

Documentation as detailed in (i) to (iv) above

- Project File

Appendix C: Non-Standard Public Lighting Indemnity Form

To: Tasmanian Networks Pty Ltd (“TasNetworks”)

Indemnity

1. **<Insert name of Council Name here>**(the **Council**) has an obligation to construct, maintain and improve local roads in its area.

2. **<Insert Name of Developer>**[(the **Developer**) is reconfiguring **<Lot Number, Property description>**] (the **Lot**) within the Council’s area, and has, as a condition of the reconfiguration, been required to construct a road, including providing public lighting for that road, to service the Lot.

3. The lighting scheme arrangements shall be as follow:
 - a. If the lighting scheme is under the Private Contract light tariff, TasNetworks will operate and maintain the luminaire
 - b. If the lighting scheme is under the Private Road light tariff, TasNetworks will own, operate and maintain the luminaire

4. The Council has approved the design specification of the public lighting.

5. The Council indemnifies and shall keep indemnified TasNetworks against all actions, suits, proceedings, claims, demands, costs, losses, damages and expenses howsoever caused arising out of any deficiencies, deviations or differences between the design specification and AS/NZS 1158 (including for death, personal injury, property damage and the legal costs of enforcing this indemnity).

Dated this _____ day of _____ 20____

.....
on behalf of the Council

.....
Witness

Appendix D: Request for Information Form

Note: This form is a template and may be adapted as necessary to suit the nature of the request and complexity of information required.

TasNetworks Ref:

Development Title:

.....

SUBJECT:

To:	
Cc:	
Requested by:	
Date of Request:	
Response Required By:	
Details of RFI:	
<p>To be compiled by the originator</p>	
Details of Response:	
Response By:	Date:

RFI Closed By:

Date Closed: